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ABSTRACT

The number of scientists and engineers employed at universities and colleges has shown an increase in each of six consecutive surveys conducted between 1965 and 1975. Since 1965 the number of those employed full-time has expanded from 142,700 to 239,000 or 68 percent, while the number of part-time scientists and engineers grew from 36,200 to 58,000, or 60 percent. The rate of growth, however, has slowed considerably in recent years. For example, the number of full-time scientists and engineers rose at an average annual rate of 7.7 percent during the 1965-71 period, fell to 1.5 percent between 1971 and 1974, and increased slightly, by 3 percent from 1974 to 1975. The only significant reduction in a major full-time employment category over the last 10 years occurred in engineering-- down 3 percent from 1973 to 1974, and another 1 percent from 1974 to 1975. Changes were also noted in fields of employment, types of institutions, employment of Ph.D.'s, employment of women, and employment of graduate students. (Author)

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HIGHLIGHTS

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Employment of Academic Scientists and Engineers Increases From January 1974 to January 1975

Of the 2,230 institutions included in NSF's 1975 survey, the number of respondents was 1,818, or 82 percent. NSF provided estimates for the remaining 412 nonrespondents. Among the 293 doctorate-granting institutions surveyed—which account for more than two-thirds of total employment of academic scientists and engineers—the response rate was 95 percent. The high response rate for these larger institutions limited estimates for nonresponse to 9 percent of the universe total.

- The 1975 employment of full-time scientists and engineers in higher education increased nearly 3 percent over the 1974 level to a new high of 239,200. The increase was somewhat greater than that for the 1971-74 average of 1.5 percent. Part-time scientist and engineer (S/E) employment jumped 10 percent to 58,100, also a new high.

- In absolute terms the largest gain in employment was reported for full-time biological scientists, up 1,700, or 6 percent, over 1974.

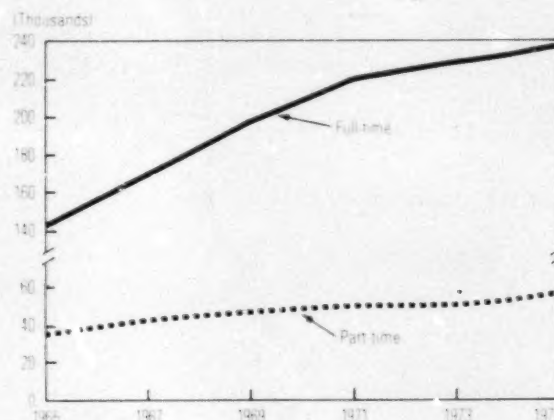
- The position of private academic institutions in terms of S/E employment continued to weaken in 1975. They registered an overall 1-percent decline in full-time scientists and engineers to a level of 71,500. Public institutions, on the other hand, reported an increase of 4 percent to a new high of 167,700. The proportion of scientists and engineers accounted for by private institutions has declined steadily for at least the last six years, from 36 percent of the total in 1969 to 30 percent in 1975.

- Women showed larger percentage increases in employment than men in all major fields except the environmental sciences. Employment of women increased 5 percent compared to 2 percent for men. Despite the higher employment growth rate for women, their proportion of total full-time scientists and engineers, 15 percent, increased less than 1-percentage point in 1975.

Trends

The number of scientists and engineers employed at universities and colleges has shown an increase in each of six consecutive surveys conducted between 1965 and 1975 (chart 1). Since 1965 the number of those employed full time has expanded from 142,700 to 239,200, or 68 percent, while the number of part-time scientists and engineers grew from 36,200 to 58,000, or 60 percent. The rate of growth, however, has slowed considerably in

Chart 1. Scientists and engineers employed at universities and colleges, January 1965-75



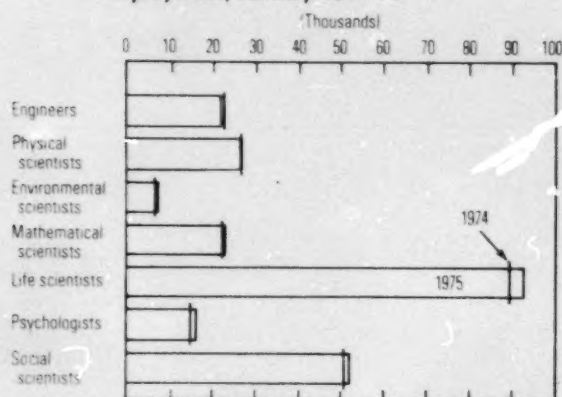
SOURCE: National Science Foundation

recent years. For example, full-time scientists and engineers rose at an average annual rate of 7.7 percent during the 1965-71 period, fell to 1.5 percent between 1971 and 1974, and increased slightly, by 3 percent, from 1974 to 1975. The only significant reduction in a major full-time employment category over the last 10 years occurred in engineering—down 3 percent from 1973 to 1974, and another 1 percent from 1974 to 1975.

Field of Employment, 1974-75

Fluctuations in full-time S/E employment by major field ranged from a 1-percent decline in engineers to an 8-percent increase in psychologists (chart 2). Within the major fields, changes in employment levels ranged from a decrease of 7 percent for aeronautical and astronautical engineers to an increase of 8 percent for oceanographers.

Chart 2. Full-time scientists and engineers employed at universities and colleges, by major field of employment, January 1974-75



SOURCE: National Science Foundation.

The life sciences continued to account for a significantly greater share of academic scientists and engineers than any other major field. In 1975, the 92,400 full-time scientists and engineers in the life sciences comprised 39 percent of all full-time S/E personnel employed by academic institutions. The largest absolute gain in full-time employment was 1,700 for biological scientists, which increased to 33,300, or 14 percent of the total. The social sciences, with 52,100 full-time scientists and engineers, or 22 percent of the total, placed a distant second to the life sciences.

Type of Control, 1969-75

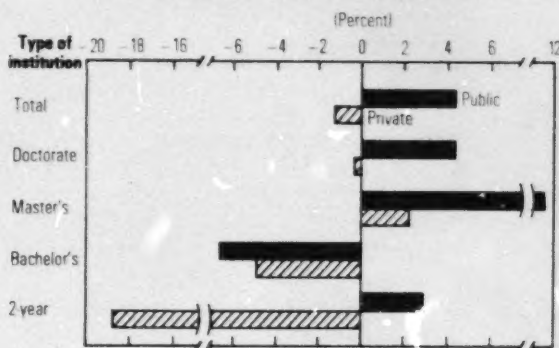
The position of private academic institutions in S/E employment continued to weaken in 1975 when compared with public institutions. From January 1974 to January 1975 full-time employment of these personnel at private universities and colleges declined by 1 percent to a level of 71,500. Public institutions, on the other hand, reported a 4-percent increase in full-time employment to a new high of 167,700. The proportion of scientists and engineers accounted for by private institutions has declined steadily from 36 percent in 1969 to 30 percent in 1975. This represents a relative drop of more than one-sixth in the private sector's share of academic S/E full-time employment.

There is also a growing gap between public and private institutions in the employment of part-time scientists and engineers. In the last year part-time employment at public institutions rose by 14 percent, more than three times the relative increase registered by private institutions.

Level of institution, 1974-75. The differences noted above in the rates of change in employment between public and private institutions are evident at both the

graduate level and at the 2-year college level (chart 3). Public graduate institutions accounted for nearly all of the increase in employment of full-time scientists and engineers; doctorate-granting institutions showed a 4-percent rise and master's-granting institutions an 11-percent increase in full-time employment. Private doctorate-granting institutions, on the other hand, exhibited a decline of less than 1 percent, and private master's-granting institutions showed a 2-percent increase in full-time scientists and engineers. Full-time S/E employment at public 2-year institutions rose by 3 percent, compared to a 19-percent decline at private 2-year institutions.

Chart 3. Change in employment of full-time scientists and engineers at universities and colleges, by type of institution and control: January 1974-75



SOURCE: National Science Foundation.

Ph.D.'s, 1974-75

While overall employment of full-time scientists and engineers increased by 3 percent, employment of Ph.D.'s increased by 4 percent to 131,900. Ph.D.'s now account for 55 percent of all full-time scientists and engineers, compared to 54 percent in 1974. By level of institution, the proportion of Ph.D.'s ranges from a high of 59 percent at doctorate-granting institutions to a low of 13 percent at 2-year institutions. There was little change in these proportions at both doctorate-granting and 2-year institutions from 1974 to 1975. Over the 1969-73 period, however, the level of Ph.D.'s at doctorate-granting institutions rose from 53 percent to 57 percent, while the proportion of Ph.D.'s at 2-year institutions increased from 10 percent to 12 percent.

Women Scientists and Engineers, 1974-75

Women showed larger gains in employment than men in all major fields except in the environmental sciences (chart 4). Overall, women posted a 6-percent gain in employment, compared to a 2-percent rise for men. Higher percentage gains for women were reflected at

TABLE 1. DISTRIBUTION OF FULL-TIME SCIENTISTS AND ENGINEERS AT 50 LEADING DOCTORATE GRANTING INSTITUTIONS, BY EMPLOYMENT CATEGORY AND SEX: JANUARY 1975

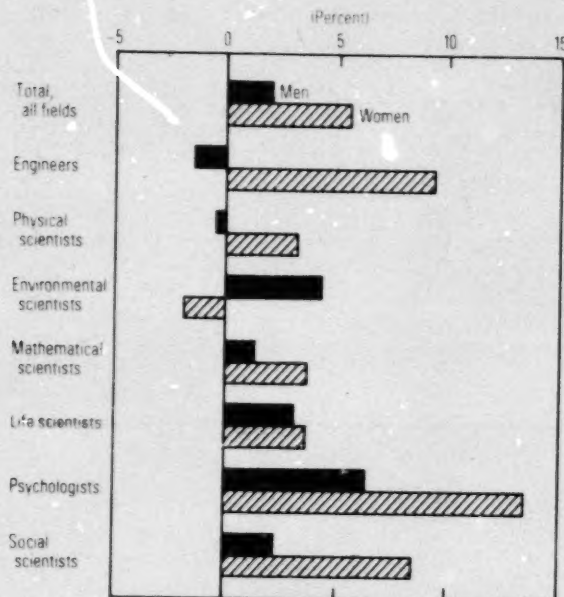
	TOTAL, ALL CATEGORIES		ENGINEERING		PHYSICAL SCIENCES		ENVIRONMENTAL SCIENCES		MATHEMATICAL SCIENCES		LIFE SCIENCES		PSYCHOLOGY		SOCIAL SCIENCES	
	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN	TOTAL	WOMEN
TOTAL, ALL DOCTORATE INSTITUTIONS	154922	22474	16431	318	14940	829	4383	200	9886	877	77536	15258	7220	1461	24346	3531
1 UNIVERSITY OF MICHIGAN	3293	774	348	21	263	36	82	2	123	12	1889	561	154	45	434	87
2 HARVARD UNIVERSITY	2904	374	43	1	241	17	16	0	41	4	2343	325	51	9	174	18
3 UNIVERSITY OF MINNESOTA	2782	438	184	1	163	8	61	3	134	10	1551	281	121	20	566	115
4 UNIV. OF WISCONSIN-MADISON	2725	562	239	17	262	14	130	15	111	3	1340	336	213	71	634	106
5 OHIO STATE UNIVERSITY	2349	485	263	4	157	5	53	1	100	6	1454	426	68	5	294	38
6 TEXAS A & M UNIVERSITY	2324	474	349	6	96	1	67	3	61	5	1379	610	29	6	363	41
7 UNIVERSITY OF WASHINGTON	2095	555	176	3	109	6	180	8	85	2	1396	513	34	6	151	17
8 UNIV. ILLINOIS-URBANA	2037	319	354	7	210	11	36	2	200	25	915	244	89	12	233	18
9 UNIVERSITY OF FLORIDA	1965	162	183	2	149	2	34	0	91	7	1123	90	85	12	298	49
10 PENNSYLVANIA STATE UNIV	1930	148	443	5	204	10	90	2	174	19	684	70	82	18	253	24
TOTAL 1ST 10 INSTS.	24431	4291	2582	67	1854	110	729	36	1102	43	14674	3256	910	286	3180	523
11 JOHNS HOPKINS UNIVERSITY	1889	263	55	1	95	8	31	1	55	8	1500	219	30	8	123	20
12 UNIV. OF TEXAS AT AUSTIN	1743	353	270	30	405	30	116	19	145	21	242	94	145	44	420	115
13 MASS. INST. OF TECHNOLOGY	1711	427	766	61	290	23	80	15	131	13	234	91	23	4	182	18
14 CORNELL UNIVERSITY	1709	208	246	6	140	8	44	1	42	0	968	113	48	7	332	75
15 YALE UNIVERSITY	1677	480	53	0	137	11	37	3	64	1	1191	418	49	24	164	23
16 STANFORD UNIVERSITY	1660	282	210	5	153	8	39	1	70	4	1026	233	31	10	134	23
17 WASHINGTON UNIV. ST. LOUIS	1608	264	72	1	54	4	11	3	27	0	1321	237	25	3	98	14
18 UNIVERSITY OF PITTSBURGH	1603	451	123	2	126	6	17	0	112	21	678	330	119	49	234	43
19 PURDUE UNIV. ALL CAMPUSES	1542	150	330	4	186	6	24	1	159	14	572	86	66	10	245	29
20 MICHIGAN STATE UNIVERSITY	1574	189	118	0	173	5	35	0	180	11	703	113	114	21	301	39
TOTAL 1ST 20 INSTS.	41187	7158	4825	177	3622	215	1160	60	2017	186	22914	5190	1534	388	5415	922
21 UNIV. OF NC AT CHAPEL HILL	1567	279	0	0	98	2	39	5	60	1	1061	214	57	12	252	45
22 UNIV. OF CALIF. LOS ANGELES	1517	185	150	1	155	7	52	3	71	4	744	129	67	11	273	28
23 RUTGERS THE STATE UNIV.	1461	275	91	0	144	13	65	6	152	30	615	74	110	31	484	121
24 UNIV. OF MD COLLEGE PARK	1404	214	157	2	281	8	16	1	131	12	456	124	127	32	241	38
25 UNIV. OF CALIF. BERKELEY	1402	159	281	5	187	14	20	0	79	4	474	80	48	11	313	45
26 BAYLOR STATE UNIVERSITY	1382	252	87	1	94	7	5	0	73	4	894	188	48	6	182	46
27 NEW YORK UNIVERSITY	1377	279	6	1	102	3	1	0	95	5	844	225	79	20	247	25
28 COLUMBIA UNIV. MAIN DIV.	1343	236	105	3	149	6	87	3	35	2	771	200	35	8	163	14
29 CASE WESTERN RESERVE UNIV.	1306	190	112	2	92	4	12	0	39	4	946	165	36	3	71	12
30 UNIV. OF PENNSYLVANIA	1298	208	98	5	99	2	6	0	54	7	834	162	25	6	184	24
TOTAL 1ST 30 INSTS.	55246	9440	5968	199	5623	281	1467	98	2406	259	30553	6753	2164	528	7825	1322
31 UNIVERSITY OF CHICAGO	1273	202	33	0	170	8	41	2	66	1	752	152	50	14	161	25
32 UNIV. OF MISSOURI COLUMBIA	1249	69	120	0	72	0	18	1	48	0	748	38	44	8	195	22
33 UNIV. OF STHRN CALIFORNIA	1232	174	132	3	70	5	21	2	64	2	777	143	37	5	131	14
34 DUKE UNIVERSITY	1210	203	42	0	64	2	14	2	32	5	898	175	30	4	138	15
35 UNIVERSITY OF ARIZONA	1208	97	122	2	184	11	73	2	106	14	490	43	57	13	174	12
36 LA ST. U. BATON ROUGE	1184	256	103	0	78	1	47	4	75	10	742	214	22	4	122	23
37 UNIVERSITY OF IOWA	1186	148	66	1	74	0	13	0	59	4	771	124	31	4	174	15
38 UNIVERSITY OF KANSAS	1180	224	70	0	83	0	49	5	65	6	589	134	94	22	223	57
39 UNIVERSITY OF COLORADO	1174	114	127	1	174	3	23	0	72	7	498	78	65	7	165	18
40 UNIV. OF CALIF. DAVIS	1114	88	76	1	73	0	32	0	31	1	688	58	16	0	189	28
TOTAL 1ST 40 INSTS.	67207	11015	6866	207	6067	311	1798	116	3626	389	37086	7912	2688	689	9494	1551
41 IOWA ST. U. OF SCI & TECH	1113	103	305	3	85	3	40	0	86	5	395	42	25	4	179	46
42 TEMPLE UNIVERSITY	1104	193	27	0	68	4	0	0	71	6	620	124	117	29	201	30
43 UNIVERSITY OF GEORGIA	1035	77	24	0	84	6	37	3	62	5	545	41	95	14	184	9
44 UNIV. OF HAWAII AT MANOA	972	132	87	2	67	3	74	2	41	3	489	81	45	6	249	35
45 JACSON STATE UNIVERSITY	962	84	118	1	48	4	98	3	73	4	477	54	18	6	130	14
46 WEST VIRGINIA UNIVERSITY	959	96	123	4	38	1	14	0	43	10	614	68	36	7	91	6
47 UNIVERSITY OF ARKANSAS	953	203	91	0	49	2	11	1	24	4	620	164	16	3	140	29
48 UNIVERSITY OF CONNECTICUT	949	182	82	1	73	4	35	4	44	4	492	145	83	13	156	12
49 NORTHWESTERN UNIVERSITY	942	80	128	3	104	4	14	0	89	4	431	50	14	3	180	16
50 UNIV. OF KENTUCKY ALL CAM.	907	52	69	0	40	1	12	1	66	2	525	42	37	2	134	4
TOTAL 1ST 50 INSTS.	77094	12221	7880	221	6763	343	2133	130	4005	356	42094	8723	3078	694	11146	1720
TOTAL ALL OTHER INSTS.	77823	10253	8731	97	8177	486	2250	70	5881	521	35442	6335	4142	767	13200	1777

1/ All data are approximate.

NOTE: TABLE DOES NOT INCLUDE ANY LEADING INSTITUTION THAT (1) REQUESTED NATIONAL SCIENCE FOUNDATION ESTIMATES, OR (2) REQUESTED THAT ITS DATA BE HELD CONFIDENTIAL.

SOURCE: NATIONAL SCIENCE FOUNDATION

Chart 4. Change in employment of full-time scientists and engineers at universities and colleges, by major field and sex: January 1974-75



SOURCE: National Science Foundation

both public and private institutions. Despite the higher employment growth for women, their proportion of total full-time scientists and engineers, 15 percent, increased less than 1-percentage point in 1975.

There appears to have been a slight shift in employment of women from bachelor's and 2-year institutions to graduate institutions. At the doctorate institutions female employment grew at nearly four times the rate of men, and at master's institutions growth in female employment was more than twice that of males. At both

the bachelor's and 2-year institutions, however, female employment declined both in absolute terms and in terms of their relative share of total employment at these institutions.

At 50 leading universities, January 1975. There is wide variation in the proportion of women employed as full-time scientists and engineers at individual academic institutions (table 1). For the entire 50 institutions shown, the level ranged from a low of 5.5 percent to a high of 28.6 percent. Even among the first 10 universities the proportions vary greatly, from 7.7 percent to 26.5 percent.

Another indication of the wide variance in women's employment levels is the fact that 11 of the 50 institutions reported that women comprised less than 10 percent of total full-time S/E employment, while another 11 institutions reported the number of women employed in excess of 20 percent of their full-time S/E total.

Graduate Students, 1974-75

Graduate students employed primarily as teaching assistants and research assistants in the sciences and engineering increased by 3 percent to a new high of 99,300. The largest rates of increase were reported in the environmental sciences, psychology, and in the life sciences.

Public institutions showed a net increase of 5 percent, while private institutions registered an average decline of 2 percent. The largest reductions at private institutions occurred in the social, physical, and mathematical sciences—down 8 percent, 5 percent, and 4 percent, respectively.

The final report, *Manpower Resources for Scientific and Engineering Activities at Universities and Colleges, January 1975*, will be published in two volumes. Detailed Statistical Tables will be available later this month—the analytical portion will follow.

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